REMARKS:

Claims 1, 2, 4, 7, 9-11, 13 and 17-21 are pending and stand rejected.

It is believed that no new matter has been added by any amendments.

35 U.S.C. §112

Claims 1, 2, 4, 9-11, 13, and 17-21 stand rejected under 35 U.S.C. §102, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically the Examiner states that the lists of M_2 and M_2 do not contain hydrophilic monomers – which are required by independent claims 1 and 7. Applicant disagrees, as the M_1 monomers list includes polyethylene glycol acrylate and polyethylene glycol (meth)acrylate – which are hydrophilic monomers; and the M_2 list includes (meth)acrylic monomers - which includes acrylic acid and methacrylic acid.

Applicant has amended claims 1 and 7 to make then more clear.

35 U.S.C. §§ 102 and103(a)

Matyjaszewski

Claims 1, 2, 4-6, 13, 18 and 21 stand rejected under 35 U.S.C. §102(b) or in the alternative under 35 U.S.C. §103(a) as being anticipated by or obvious over Matyjaszewski et al. J. Phys. Org. Chem. , 2000, 13, p. 775-786. The Matyjaszewski reference fails to teach or suggest all of Applicant's claim elements, thus fails to provide a *prima facie* case of anticipation. Specifically, the Matyjaszewski reference fails to teach or suggest that the copolymer have one monomer being hydrophilic; that the resulting copolymer is soluble or dispersible in both water and organic solvent, or that the copolymer contain nitroxide residual units.

The Matyjaszewski reference relates to copolymers formed by an atom transfer radical copolymerization (ATRP). One problem with ATRP processes is that they require the addition of transition metal catalysts – and residual transition metals in the polymer can have negative effects. Applicant's copolymer is formed by anitroxide-mediated process that is free

from the transition metals in the Matyjaszewski process. The processes do not make the same gradient polymers, since the Matyjaszewski ATRP process gives a polymer having residual transition metals, while Applicant's process produces a polymer having the claimed residual nitroxide residues.

The Matyjaszewski reference discloses gradient copolymers – including the styrene acrylonitrile example on page 783, Figure 3. However, neither styrene nor acrylonitrile is a hydrophilic monomer, thus fails to meet that claim element. The Examiner cites a copolymer of styrene and butyl acrylate as falling within Applicant's claimed monomers. While it is true that styrene would fall in Applicant's M_2 monomers and butyl acrylate is from Applicant's M_1, neither is hydrophilic – as required by Applicant's claims that at least 5% of the monomer units in the copolymer be hydrophilic – with specific hydrophilic monomer claimed.

The Matyjaszewski reference is silent on requiring a hydrophilic monomer, and is silent on the level of hydrophilic monomer that must be present – except that every example in the Matyjaszewski reference contains ZERO hydrophilic monomer. One of ordinary skill in the art would find no motivation in the Matyjaszewski reference to even try to produce a gradient copolymer having at least 5% by weight of hydrophilic monomers selected from Applicant's amended claims – but would find in the Examples (no hydrophilic monomer in any) and silence regarding hydrophilicity/hydrophobicity a teaching away from Applicant's claims.

The Examiner correctly cites that one must rely not only on preferred embodiments, but on the whole reference. Applicant agrees – and the whole reference fails to teach or suggest the required use of at least one hydrophilic monomer at above 5%. Silence is not a teaching that would motivate one of ordinary skill in the art to even try the missing element of Applicant's claim, and the weight of ALL Examples teaching ZERO hydrophilic monomer would serve as a motivation

Matyjaszewski in view of Farcet

Claims 7, 9, and 10 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Matyjaszewski et al. J. Phys. Org. Chem. , 2000, 13, p. 775-786, in view of Farcet et al. "Nitroxide-mediated mini-emulsion polymerization of n-butyl acrylate: synthesis of controlled homopolymers and gradient copolymers with styrene".

As discussed above, the Matyjaszewski reference fails to teach or suggest a required specific hydrophilic monomer at the level required by Applicant's claims and a residual nitroxide residue. The Farcet reference is a secondary reference cited for its disclosure of specific nitroxides in mini emulsions. The Farcet reference, however, also fails to teach or suggest a required specific hydrophilic monomer at the level required by Applicant's claims, as amended, and therefore fails to heal the deficiencies of the Matyjaszewski reference.

Nesvada

Claims 1, 2, 4-7, 9,10, 13, and 17-20 and 21 stand rejected under 35 U.S.C. §103(a) as being unpatentable as obvious over Nesvadba et al. (U.S. Patent 6,262,206). The Nesvadba reference fails to teach or suggest all of Applicant's claim limitations, thus fails to provide a *prima facie* case of obviousness. Specifically, the Nesvadba reference fails to teach or suggest Applicant's specific COMBINATION of gradient copolymer, monomer % and Tgs; and where the copolymer is soluble or dispersible in both water and in organic solvents.

The Examiner is confusing the polymerization of monomers in water or organic solvent, with the property of the gradient copolymer itself being soluble in water or organic solvent at a concentration greater than or equal to 5%. Processes for forming a polymer by solution, emulsion or suspension polymerization are well-known. The polymer can be made to stay suspended or dispersed by using stirring, cosolvents and dispersing aids (or emulsifiers). However, while the polymers may be suspended – they are not soluble in the suspending agent. The Nesvada reference even points to the use of cosolvents or surfactants for forming the polymer (Col. 9, lines 64-67), and these prevent the precipitation or phase separation of the reactants or polymer products until after the polymerization reactions (Col. 10, lines 19-21). A suspension by chemical or physical means in NOT the same as a solution! The Nesvadba reference does not teach or describe a gradient polymer soluble at least 5% in both water and organic solvent.

The Examiner's fall-back position is that the dual solubility would be an inherent property of copolymers in the Nesvada reference – since the Nesvada wash lists of monomers includes monomers falling within each of Applicant's required elements. The Nesvada structures include homopolymers, random copolymers, block, star and gradient copolymers (Col. 12, lines 56-58).

But there is no teaching or suggestion of a gradient copolymer that requires at least two different monomers, with at least 50% by weight having a Tg <20°C, and a monomer having a Tg >20°C, where at least 10% is a hydrophilic monomer, at the right Mn and Mw, and using the specific monomers of Applicant's amended claims. The Nesvada teaching encompasses every type of polymer architecture, and most possible monomers. Applicant's invention could perhaps be considered a selection invention, in which specific parameters were selected to obtain a gradient copolymer of higher molecular weight that is soluble in both water and solvent at 5% or greater. There is no teaching or suggestion in the Nesvada reference to even try to obtain such a special copolymer – yet many, many teachings of homopolymers and copolymers that fall outside of Applicant's narrow claims. Since the Nesvada reference fails to teach or suggest with any specificity a gradient copolymer having Applicant's claimed composition, the copolymers taught and suggested by Nesvada would not have the same inherent properties.

Further, none of the many Nesvadba Examples exemplify Applicant's claimed copolymer (meaning all of the examples teach away from Applicant's claims

Every element of a claimed invention may often be found in the prior art. However, identification in the prior art of each individual part claimed is insufficient to defeat patentability of the whole claimed invention. Rather, to establish obviousness based on a combination of the elements disclosed in the prior art, there must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by applicant. *In re Kotzab,* 55 U.S.P. Q.2d 1313, 1316 (Fed. Cir. 2000) (citations omitted).

Applicant's invention relates to the field of amphiphilic gradient copolymers that are soluble in water as well as in organic solvents. (Specification, page 1, lines 13-15). Since the solubility of a copolymer in water and solvent was not recognized as a result to achieve in the '206 patent, the composition could not be optimized through routine experimentation to obtain such a result.

In view of the above, the Applicant believes that the reasons for rejection have been overcome, and the claims herein should be allowable to the Applicant. Accordingly, reconsideration and allowance are requested.

Respectfully submitted;

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